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| APPLICATION NO.   | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO.     | CONFIRMATION NO. |
|---|-------------|----------------------|-------------------------|------------------|
| 09/829,187  | 04/09/2001  | Sarah F. Frisken     |                         | 9214             |
| 7590  | 06/04/2004  |                      | EXAMINER                |                  |
| Patent Department<br>Mitsubishi Electric Research Laboratories, Inc.<br>201 Broadway<br>Cambridge, MA 02139 |             |                      | CARTER, AARON W         |                  |
|   |             |                      | ART UNIT                | PAPER NUMBER     |
|   |             |                      | 2625                    |                  |
|   |             |                      | DATE MAILED: 06/04/2004 |                  |

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Please find below and/or attached an Office communication concerning this application or proceeding.

| <b>Office Action Summary</b> | <b>Application No.</b>            | <b>Applicant(s)</b>     |
|------------------------------|-----------------------------------|-------------------------|
|                              | 09/829,187                        | FRISKEN ET AL.          |
|                              | <b>Examiner</b><br>Aaron W Carter | <b>Art Unit</b><br>2625 |

## **Office Action Summary**

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

1)  Responsive to communication(s) filed on 09 April 2001.

2a)  This action is **FINAL**.                            2b)  This action is non-final.

3)  Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

4)  Claim(s) 1-4 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.

5)  Claim(s) \_\_\_\_\_ is/are allowed.

6)  Claim(s) 1 and 2 is/are rejected.

7)  Claim(s) 3 and 4 is/are objected to.

8)  Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

9)  The specification is objected to by the Examiner.

10)  The drawing(s) filed on 09 April 2001 is/are: a)  accepted or b)  objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)  The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)  Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)  All    b)  Some \* c)  None of:

1.  Certified copies of the priority documents have been received.
2.  Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3.  Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1)  Notice of References Cited (PTO-892) 4)  Interview Summary (PTO-413)  
2)  Notice of Draftsperson's Patent Drawing Review (PTO-948) Paper No(s)/Mail Date. \_\_\_\_\_  
3)  Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 2. 5)  Notice of Informal Patent Application (PTO-152)  
6)  Other: \_\_\_\_\_

**DETAILED ACTION**

***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1 and 2 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent 5,867,592 to Sasada et al. ("Sasada").

Sasada discloses a method for determining a gradient magnitude image from a range image, the range image including a plurality of intensity values at pixel locations, comprising:

Determining, for each pixel (i,j), a horizontal central difference  $dx$ , an a vertical central difference  $dy$  (column 10, lines 25-30); and

Setting a 2D gradient magnitude at each pixel (i,j) in a gradient magnitude image  $I_{GM}$  to  $\sqrt{Gx^2+Gy^2}$  (column 10, lines 31-51).

Sasada does not disclose expressly disclose the addition of 4 with the elements of which the square root is to be taken and then multiplying the entire gradient magnitude by one half.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to add 4 with the elements inside the square root and then multiply everything by one half. Applicant has not disclosed that adding 4 with the elements of which the square root is to be

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taken or that multiplying by one half provides an advantage, is used for a particular purpose or solves a stated problem. One of ordinary skill in the art, furthermore, would have expected Applicant's invention to perform equally well with the basic gradient magnitude equation disclosed by Sasada because adding 4 with the elements of which the square root is to be taken and then multiplying by one half simply makes the minimum gradient magnitude value at 1 instead of 0, which does not appear to provide an advantage.

Therefore, it would have been obvious to combine to one of ordinary skill in this art to modify the teaching of Sasada, by adding 4 with the elements of which the square root is to be taken and then multiplying by one half, to obtain the invention as specified in claim 1.

As to claim 2, Sasada discloses a method of claim 1, further comprising:

Scaling the range image to produce a scaled range image where a unit intensity value at each pixel corresponds to a unit distance value (Fig. 5, "Distance Image Prepared").

#### ***Allowable Subject Matter***

3. Claims 3 and 4 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

#### ***Conclusion***

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

US Patents 5,224,208 to Miller, Jr. et al. discloses finding the gradient magnitude.

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US Patent 6,469,700 to Munshi et al. discloses finding the gradient magnitude.

US Patent 6,184,887 to Rohner discloses finding the gradient magnitude.

US Patent 5,548,694 to Friskin Gibson discloses an invention by common inventors.

US Patent 6,262,738 to Gibson et al. discloses an invention by common inventors.

US Patent 6,724,393 to Perry et al. discloses an invention by common inventors..

US Patent 6,396,492 to Friskin et al. discloses an invention by common inventors.

US Patent Application Publication 2002/0130858 to Perry et al. disclose an invention by common inventors.

US Patent Application Publication 2002/0130856 to Perry et al. disclose an invention by common inventors.

US Patent Application Publication 2002/0130859 to Perry et al. disclose an invention by common inventors.

US Patent Application Publication 2002/0130854 to Perry et al. disclose an invention by common inventors.

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Aaron W Carter whose telephone number is (703) 306-4060. The examiner can normally be reached on 7am - 3:30 am (Mon. - Fri.).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh Mehta can be reached on (703) 308-5246. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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